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- could identify individual components of a complex figure
- did a solid job on a task involving complex geometric patterns
- when given sufficient time, able to assemble red/white blocks to replicate increasingly complex patterns

## semantic understanding

was terrific at explaining how two words are somehow related

## sentence comprehension and formulation

- constructed excellent sentences from word prompts
- was terrific at drawing inferences when presented with language that was missing information.

Neurodevelopmental Challenges. This section includes some of the qualitative and quantitative evidence used to identify the weaker aspects of Ajay's neurodevelopmental profile. As was the case with his assets (see above) these examples are a sampling of the information considered in the assessment. Some normed scores were interpreted in conjunction with the qualitative findings and are included at the end of this report.

### long-term memory access

- · did not recall much of a word list after an extended delay
- struggled to learn words coupled with symbols, even though he was taught the pairs several times
- · drew little of a design from memory after a long delay

#### parts of language

- had trouble listing as many members of a category (e.g., animals) as he could in a brief amount of time (word retrieval)
- had trouble with comprehension questions about a narrative passage (i.e., conveying a plot) (discourse processing)
- struggled when asked comprehension questions for an expository passage (such as might be found in a chapter of a science textbook) (discourse processing)

#### processing depth

- makes random errors in his academic work
- made math errors due to misreading function signs or missing key details in the problems
- missed several small details in pictures or drawings
- missed details in story

#### rate of processing/production

worked at an exceptionally slow pace

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- reading fluency was at the 14<sup>th</sup> percentile for his age
- · had trouble completing timed tasks within time limits

<u>Academic.</u> The educational portion of the evaluation was primarily a dynamic assessment consisting of a series of tasks selected specifically for Ajay based on background information. During the assessment, the learning specialist observed closely for academic strengths, patterns of errors, breakdown points, and other observable phenomena that could be linked to Ajay's neurodevelopmental functioning. Ajay was also interviewed about approaches to tasks, and various teaching strategies were implemented to determine what interventions may be the most helpful to incorporate in his learning plan. In addition to these dynamic procedures, selected standardized tasks were utilized and some normative scores were generated.

The information below summarizes the key findings of the academic assessment for reading (decoding and comprehension), spelling, written expression, and math (operations and reasoning).

## reading decoding

- decoded age-level words in isolation with good accuracy, hesitating only once (before reading nucleic)
- experienced slightly more difficulty when reading age-level nonsense words; errors consisted of omissions (e.g. "frazlition" for <u>frazlitition</u>) (demonstrates intact phonics knowledge)
- was somewhat choppy but accurate when reading age-level sentences in isolation
- in general, mispronounced uncommon words encountered in reading (e.g. "CHO-fer" for chauffer, "debutantays" for debutantes)
- read a paragraph of an age-level expository text aloud with perfect accuracy and good fluency and prosody
- reading rate was considerably slower than average on both an informal measure of reading speed (99 WPM) and an standardized measure (Nelson-Denny: 14<sup>th</sup> percentile)

#### reading comprehension

- was generally accurate when retelling isolated sentences, though demonstrated some confusion about word meaning (e.g. substituted "trade" for <u>avid</u>) (indicates good sentence comprehension)
- experienced some difficulty defining vocabulary words across various tasks
- had difficulty answering some concept questions prior to reading passage which required him to define words and recall specific events in history (indicative of poor long-term memory recall)
- when asked to highlight main ideas in a paragraph from passage, selected relevant, appropriate sentences (demonstrates good saliency determination)

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- provided a non-sequential summary from memory after reading expository passage, which contained both main ideas and details; of note, retelling was choppy, with a great deal of hesitation between phrases (reveals weak discourse processing/production)
- had difficulty stating main idea of passage concisely, listing information from passage instead of providing a concise answer
- was able to answer most implicit questions correctly, but experienced difficulty recalling answers to explicit questions that required him to recall specific details (suggests difficulty regulating processing depth)
- successfully used the opportunity for a look-back to correct an inaccurate answer
- of note, answers were generally wordy and focused on small details rather than unifying trends; word use was often imprecise (e.g. "reception" instead of <u>interception</u>, "avoided them having to" instead of <u>prevented them from having to</u>)
- on a standardized measure of reading comprehension, performed in the average range (Nelson-Denny: 35<sup>th</sup> percentile)

## spelling

- demonstrated skills in the late "derivational relations" stage of spelling development, suggesting spelling within age-level range (demonstrates good phonics knowledge/orthographic memory)
- able to spell words containing syllable junctures and prefixes/suffixes (e.g. <u>resident</u>, <u>puncture</u>, <u>adjourn</u>)
- experienced some difficulty spelling words with reduced/altered vowels and bases/roots (e.g. "comotion" for commotion; "camaflouged" for camouflage)
- comparable performance on spelling recognition task, which required him to select correct spelling of words; of note, tended to misidentify as correct words he spelled incorrectly
- in context, demonstrated some confusion between simple homophones ("your" for you're); was otherwise very accurate

### written expression

- wrote three sentences from dictation with generally good mechanical accuracy (suggests good active working memory)
- demonstrated some knowledge of comma use, capitalization, quotation mark placement, and appropriate ending punctuation
- experienced some difficulty with apostrophe use, comma placement in dialogue, and capitalization of proper nouns
- prior to assessment, wrote part of an introductory paragraph for a persuasive essay in which he acknowledged both sides of the issue
- writing was wordy and somewhat difficult to follow
- word use and tone were academic and appropriate for task

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- writing samples submitted effectively followed a specific format (patient write-up) and contained well-constructed sentences featuring appropriate word use and generally good mechanical accuracy
- on a standardized writing task, well able to convey ideas in writing in response to a variety of demands (Writing Samples, scaled score = 118)
- was slow to write sentences, generally pausing many times to reconsider wording midsentence and making numerous corrections; reread work methodically before moving on (indicates slow rate of processing/production)

### math operations

- able to solve simple addition, subtraction, and multiplication math facts with good automaticity (Math Fluency, scaled score = 105)
- recalled procedures for operations involving fractions, decimals, negative numbers, basic algebra, and order of operations
- correctly solved problems requiring him to plot points and graph a line
- used correct formula to find circumference of a circle, but produced an inaccurate answer due to procedural error
- was incorrect in calculating surface area of a rectangular prism due to failure to notice all of the measurements on presented graphic
- could not recall definition for standard notation and thus had some difficulty solving problem
- able to correct calculation errors quickly when they were pointed out to him; stated that
  he often makes these errors and sees them if he checks his work, though he doesn't
  always do so (indicative of shallow processing depth)
- occasionally skipped homework problems because his scratch work made them difficult to notice on the sheet

#### math reasoning

- preferred to use logic rather than step-by-step procedures (especially when working with percentages) to solve problems which led to some inaccuracies in his answers (suggests weak long-term memory recall)
- able to recognize and complete a complex number pattern, though employed a complicated, time-consuming strategy for finishing pattern
- · counted money in a sequential way, though failed to notice all of the coins
- used correct operations to solve an elapsed time problem on paper, though answered incorrectly due to a calculation error (which he self-corrected later)
- developed and solved an algebraic equation based on a word problem
- solved a multi-step geometry problem by jotting down numbers as he calculated them and without drawing the figure to help him visualize it
- able to recognize congruent/non-congruent shapes (indicates good spatial processing)
- was slightly slower when solving word problems with extraneous information, but was able to identify relevant information and answer correctly

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## RELEVANT MEDICAL INFORMATION

Ajay reports that with the exception of long-standing attention deficit disorder, anxiety, and speech problems (i.e., cluttering), he has been in generally good health with no other significant medical or surgical problems. His current medications include Vyvanse® (lisdexamfetamine dimesylate), Strattera® (atomoxetine), and Buspar® (buspirone).

Ajay appeared to be well developed, well nourished, and in good general health. Stereoscopic vision screening indicated that Ajay has good visual acuity in both eyes for distance and near vision. A pure tone hearing screening across the frequency range of 1000 to 4000 Hz. indicated that Ajay's threshold for hearing is normal. The remainder of his physical examination was deferred at this time.

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## **RELEVANT INFORMATION ON EMOTIONS AND BEHAVIOR**

Ajay remains in treatment for attention deficit and anxiety. As part of our assessment, Ajay completed the Behavior Rating Inventory for Executive Function (BRIEF). His responses on the BRIEF were consistent with significant difficulties with shifting focus (T=72/99<sup>th</sup> percentile), working memory (T=77/99<sup>th</sup> percentile), planning/organization (T=74/>99<sup>th</sup> percentile), task monitoring (T=77/98<sup>th</sup> percentile), and increased risk of difficulties with inhibition (T=69/93<sup>rd</sup> percentile) and task initiation (T=65/93<sup>rd</sup> percentile).

## PREVIOUS ASSESSMENTS

No results of previous assessments were available.

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## APPENDIX

The following clinical tools were used in Ajay's assessment.

### Neurodevelopmental Assessment Procedures.

Delis-Kaplan Executive Function System

**Tower Test** 

**Trail Making Test** 

**Twenty Questions Test** 

**Verbal Fluency Test** 

Kaufman Brief Intelligence Test- Second Edition

Nonverbal

**Rey Complex Figure Test and Recognition Trial** 

Rey Copy Trial

Rey Delayed Recall Trial

Rey Immediate Recall Trial

Rey Recognition Trial

Wechsler Adult Intelligence Scale- Third Edition

**Block Design** 

Digit Span

**Similarities** 

Wide Range Assessment of Memory and Learning-Second Edition

Sentence Memory

**Story Memory** 

Story Memory Delay Recall

Story Memory Recognition

Verbal Learning

Verbal Learning Delay Recall

Verbal Learning Recognition

Verbal Working Memory

Woodcock-Johnson III Tests of Cognitive Abilities

Visual-Auditory Learning

Visual-Auditory Learning-Delayed

## **Educational Assessment Procedures.**

**Qualitative Reading Inventory** 

Subject Word List

Reading Passage, High School level

Words Their Way, Third Edition

**Upper Level Spelling Inventory** 

Homework Packet

Student interview (with Ajay)

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Surveyor of Academic Attainment
Woodcock-Johnson III Tests of Achievement, Form B
Math Fluency
Reading Fluency
Writing Samples

## Other Assessment Procedures.

Behavior Rating Inventory for Executive Function-Adult-Self Report Student interview (with Ajay)

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### **Subtest Scores**

Ajay's neurodevelopmental and academic assessments incorporated a comprehensive array of tools generating both quantitative and qualitative data. Findings were integrated with information from home and school to uncover his profile. The following normed scores represent only a small portion of the data considered in our assessment and must therefore be interpreted with caution.

Tasks Administered*	scaled score	standard score	T score	Percentile
Delis-Kaplan Executive Function System				
Trail Making Test				
Visual Scanning	12			75
Number Sequencing	7			16
Letter Sequencing	9			37
Number-Letter Switching	10			50
Motor Speed	12			75
Twenty Questions				
Initial Abstraction Score	11			63
Total Questions Asked	12			75
Total Weighted Achievement Score	13			84
Tower Test				
Total Achievement Score	11			63
Verbal Fluency Test				
Letter Fluency	9			37
Category Fluency	8			25
Category Fluency	9			37
Category Switching	10		1	50
Kaufman Brief Intelligence Tests – 2 <sup>nd</sup> Edition				
Nonverbal		109	1	73
Nelson-Denny Reading Test, Form H				1
Reading Rate			1	14
Comprehension			1	35
Rey Complex Figure Test and Recognition Trial				
Rey Copy Trial**		1		>16
Rey Immediate Trial		1	32	4
Rey Delayed Trial			<20	<1
Rey Recognition Trial			41	18
Wechsler Adult Intelligence Scale – 4 <sup>th</sup> Edition		1	1	10
Block Design	7		1	16
Block Design No Time Bonus	8			25
Similarities	14	1	1	91
Digit Span	7		1	16

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Digit Span Forward	8		25
Digit Span Backward	9		37
Digit Span Sequencing	6		9
Wide Range Assessment of Memory and Learning- 2 <sup>nd</sup> Edition			
Story Memory	8		25
Story Memory Delay Recall	9		37
Story Memory Delay Recognition	4		2
Verbal Learning	9		37
Verbal Learning Delay	6		9
Verbal Learning Recognition	10		50
Sentence Memory	11		63
Verbal Working Memory	11		63
Woodcock-Johnson III Tests of Achievement, Form A			
Reading Fluency		84	15
Math Fluency		105	64
Writing Samples		118	89
Woodcock-Johnson III Tests of Cognitive Abilities	-		
Visual-Auditory Learning		80	9
Visual-Auditory Learning - Delayed		79	8

<sup>\*</sup>This table only includes scores for subtests administered in the standard fashion and as such may not include all items listed in the Appendix.

Note- Normed/standard scores compare Ajay's performance on a task to the performance of same-age peers. A score that is close to the mean score represents performance that is typical for a student his age. Following are common standard scores, including means and average ranges.

score type	mean	standard deviation	average range
subtest/scaled score	10	3	8 to 12
standard score	100	15	86 to 114
T score	50	10	41 to 59

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Paul B. Yellin, M.D., F.A.A.P.

Betti Suedogni

Beth Guadagni, M.A.

<sup>\*\*</sup>These tests use Criterion Scores

## The Neurodevelopmental Framework of The Yellin Center

A person's neurodevelopmental functions can be divided into eight constructs (or systems). Each of these constructs contains related functions or components. Below is a listing of the eight constructs, along with the functions contained in each.

On the following pages is a glossary that includes definitions for these terms. Since every person has a different profile, not all of these terms will be discussed in this report.

1. ATTENTION
Mental Energy Control System
Alertness
Mental Effort
Sleep-Arousal Balance
Performance Consistency
Processing Control System
Saliency Determination
Processing Depth (Depth of Processing)
Cognitive Activation
Focal Maintenance
Satisfaction Level
Production Control System
Previewing
Facilitation and Inhibition
Pacing
Self-monitoring
Reinforceability
2. MEMORY
Short-Term Memory
Active Working Memory
Long-Term Memory Storage
Long-Term Memory Access
3. LANGUAGE
Receptive Language
Phonological Processing
Morphological Sense
Semantic Understanding
Sentence Comprehension
Discourse Processing
Expressive Language
Articulation and Fluency
Semantic Use
Word Retrieval
Sentence Formulation
Discourse Production
Verbal Elaboration

4. TEMPORAL-SEQUENTIAL ORDERING	
Sequential Awareness/Perception	
Sequential Memory	
Sequential Output	
Time Management	
Higher Sequential Thinking	
5. SPATIAL ORDERING	
Spatial Awareness/Perception	
Spatial Memory	
Spatial Output	
Material Management	
Higher Spatial Thinking	
6. NEUROMOTOR FUNCTION	
Gross Motor Function	
Fine Motor Function	
Graphomotor Function	
7. HIGHER ORDER COGNITION	
Critical Thinking	
Creativity and Brainstorming	
Problem Solving	
Rule Use	
Reasoning and Logical Thinking	
Mental Representation	
Concept Formation	
Verbal Conceptualization	
Nonverbal Conceptualization	
Process Conceptualization	
8. SOCIAL COGNITION	
Verbal Pragmatics	
Social Behaviors	

# 

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Semantic Use	properly utilizing word meanings, defining words and using them in context
Sentence Comprehension	understanding sentences and sentence structures when listening or reading
Sentence Formulation	expressing thoughts in complete, grammatically correct sentences when speaking and writing
Sequential Awareness/Perception	processing the order of the parts of incoming information
Sequential Memory	retaining the order of steps, events, or other sequences
Sequential Output	creating products in which the content is arranged in the optimal order
Shallow Processing	weak Processing Depth, information is "in one ear and out the other" (also called Superficial Processing)
Short-Term Memory	briefly registering new information that is subsequently used, stored, or forgotten
Sleep-Arousal Balance	sleeping well at night and being sufficiently awake and alert during the day
Social Behaviors	various behaviors that foster optimal relationships with others
Social Cognition	the set of abilities that guide interaction with others, both verbal (e.g., maintaining a conversation) and nonverbal (e.g., using appropriate body language)
Spatial Awareness/Perception	interpreting relationships within and between spatial patterns (e.g., pictures, diagrams, and other visual configurations)
Spatial Memory	storing and recalling spatial information (e.g., shapes, symbols, and images)
Spatial Ordering	the processing, coordination, and application of information that is visual or in a spatial array
Spatial Output	creating products that have spatial characteristics
Superficial Processing	weak Processing Depth, information is "in one ear and out the other" (also called Shallow Processing)
Temporal-Sequential Ordering	the processing, coordination, and application of information that is linear or in a serial order
Time Management	using time efficiently
Verbal Conceptualization	forming concepts using language, such as terms (e.g., due process, energy resources, friendship) and literary ideas (e.g., foreshadowing, themes)
Verbal Elaboration	extending and developing ideas through language production
Verbal Pragmatics	use and understanding of language within social contexts
Word Retrieval	finding the right words quickly and easily when speaking or writing

## **Glossary of Neurodevelopmental and Educational Terms**

Below is a list of terms that you might find in the report (in *italics*). Since every student has a unique profile, not every term listed here will be discussed in a given report.

mentally suspending information while using or manipulating it
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an effective level of focused listening, watching, and concentrating
using mouth muscles effectively (also known as Oromotor Function), enunciating correctly an generating smooth, intelligible speech
a network of interactive controls over mental functioning, including mental energy, incoming information, and regulation of output
the capacity to perform tasks rapidly with little effort, such as decoding words and retrieving information from memory
keeping track of one's body while balancing or moving
the amount of material a student takes in (e.g., reading or listening) or generates (e.g. writing)
linking incoming information with prior knowledge and experience (see Cognitive Ove activation and Cognitive Under-activation)
excessive processing, or forming connections that are not particularly relevant to the topic hand
passive processing, or not forming enough relevant associations with incoming information
integrating a series of features that often go together to form a class of ideas or objects
thinking independently and producing self-generated thoughts or other products
evaluating products, ideas, and opinions
see Processing Depth
interpreting language beyond the boundaries of a sentence, such as paragraphs, chapters, stories
communicating information in a cohesive chain of sentences (e.g., paragraphs, essays)
communicating and producing ideas orally and in writing
selecting the best option before acting or starting a task; weak facilitation and inhibition lea to impulsivity
demonstrating effective manual dexterity (hands and fingers)
responding to the challenges of fine motor activities with appropriate plans (e.g., fixing thing using tools)
sustaining concentration for the appropriate period of time (also known as attention span sustained attention)
feeling where the writing utensil (e.g., pencil) is during letter formation

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Graphomotor Function	maneuvering a utensil to produce handwriting
Graphomotor Memory	recalling letter and number forms rapidly and accurately
	implementing the act of handwriting; coordinating the motor actions needed for each aspect
Graphomotor Production	of the handwriting task
Gross Motor Function	using the body's large muscles in a coordinated, effective manner
Gross Motor Problem Solving	responding to the challenges of gross motor activities with appropriate plans (e.g., dribbling a
and Logic	ball, swinging a bat, completing a dance step)
Gross Motor Production	mobilizing the right muscles in the best order to achieve a motor goal
Higher Order Cognition	set of related processes that guide complex and sophisticated thinking
Higher Sequential Thinking	using serial order to enhance concept development and problem solving
Higher Spatial Thinking	reasoning and conceptualizing without language by using mental imagery
Language	the understanding and use of linguistic sounds, words, sentences, and discourse
Lana Tarra Marray Assass	the retrieval of information from long-term memory, including knowledge, skills, and
Long-Term Memory Access	experiences
Long-Term Memory Storage	permanently storing information, including knowledge, skills, and experiences
Material Management	organizing the various resources and supplies needed for a task
Math Operations	use of math procedures (e.g., subtraction, simplifying fractions, balancing equations)
Made Bassaria	solving math problems by applying procedures in different situations with changing
Math Reasoning	information
	storage and retrieval of information temporarily (i.e., Short-Term), over extended periods (i.e.,
Memory	Long-Term), or while using the information (i.e., Active Working)
Mental Effort	the flow of energy needed for cognitive work output (e.g., homework)
	the set of attention controls for initiating and maintaining the energy level needed for optimal
Mental Energy Control System	learning and behavior
	portraying new ideas in varied ways (e.g., anecdotal, visual, verbal, metaphoric) so they are
Mental Representation	meaningful and lasting
Meta-cognition	ability to think about thinking and learning
Morphemes	components of words that convey some meaning (e.g., prefixes, suffixes, and root words)
Morphological Sense	interpreting parts of words that convey some meaning (see Morphemes)
Morphological Use	utilizing parts of words that convey some meaning (see Morphemes)
	the nervous system's control over movement of large muscles (i.e., Gross Motor), hands and
Neuromotor Function	fingers (i.e., Fine Motor), and handwriting (i.e., Graphomotor)
	forming concepts without using language, such as place value, equations, planetary
Nonverbal Conceptualization	movements, or geometric shapes
Oromotor Function	see Articulation and Fluency
Outer Spatial Processing	interpreting and using spatial information when implementing motor activities (e.g., knowing
	1



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	how fast to run when catching a ball)
	extra movements (e.g., on the other side of the body) when performing highly specific motor
Overflow Movements	tasks; these become increasingly rare as children develop
Pacing	doing tasks at the most appropriate speed, without rushing
	linking and storing two related data bits, retrieving one piece of information when presented
Paired Associate Memory	with the other piece (e.g., sound with a symbol)
Dorformanco Consistency	a steady, reliable, and predictable flow of the mental energy needed for dependable
Performance Consistency	functioning (moment to moment, day to day, week to week)
Phonemes	individual sounds in words (e.g., the word "big" contains three phonemes: /b/, /i/, /g/)
Phonological Processing/	this process involves receiving, distinguishing, and manipulating the individual sounds in words
Awareness	(see Phonemes)
Phonics	linking speech sounds with letters and letter combinations
B	anticipating/predicting likely outcomes of actions, events, and problems; planning how to
Previewing	solve a problem before starting to work
Problem Solving	applying a systematic stepwise approach to complex questions or challenges
Procedural Recall (Memory)	storing new skills and processes that involve steps or sequences (e.g., math operations)
D Comment of line time	forming concepts that explain a mechanism or how something works (e.g., metamorphosis of
Process Conceptualization	a butterfly, digestion)
Processing Control System	the set of attention controls for regulating the use of incoming information
Processing Depth (Depth of Processing)	focusing with sufficient intensity to capture details (e.g., instructions)
Production Control System	the set of attention controls for regulating academic and behavioral output
Reading Comprehension	understanding the meaning of the reading text
Reading Decoding	reading individual words, although not necessarily having an understanding of the words
Reasoning and Logical Thinking	coming up with sensible, thoughtful answers to complex issues
Receptive Language	processing and understanding incoming oral and written information
Reinforceability	using previous experience and feedback to guide current behavior and output
Rule Use	learning, developing, and applying rules and principles
Salianas Datamaian	discriminating between important and unimportant information, avoiding distractions (also
Saliency Determination	known as selective attention)
	focusing sufficiently on activities or topics of moderate or low levels of interest; weak
Satisfaction Control	satisfaction control can lead to insatiability, or a constant desire for excitement and intense
	stimulation
Calf manitarin -	watching one's own output and making necessary modifications; finding and correcting
Self-monitoring	mistakes
Semantic Understanding	knowing the meanings of words, although not necessarily using or defining the words

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